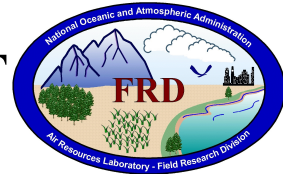


# FRD ACTIVITIES REPORT

## June 2006



### Research Programs

#### *UrbaNet/Joint Urban 2003*

Analysis of the JU03 tracer data set continued in June. The analysis of four daytime intensive observational periods (IOPs 3-6) and four nighttime IOPs (7-10) has now been completed. Some of the recent key findings, particularly for the daytime-nighttime differences, are shown in the accompanying graphs. Figure 1 plots the peak-to-mean ratio (P:M) and concentration fluctuation intensity (CFI - standard deviation divided by the mean) by the edge vortex (ev), midblock roof sampler locations (mbr), midblock street sampler locations (mbs), and open sampler locations (op). Figure 2 plots the exponential tracer decay time (Tau), fraction of the total integrated concentration measured after the tracer release is shutdown (TIF), the total time the tracer was detected (Time), and the plume arrival speed (receptor site distance from the release point divided by the plume arrival time) divided by the mean wind speed aloft

Day/Night Geometry Effects

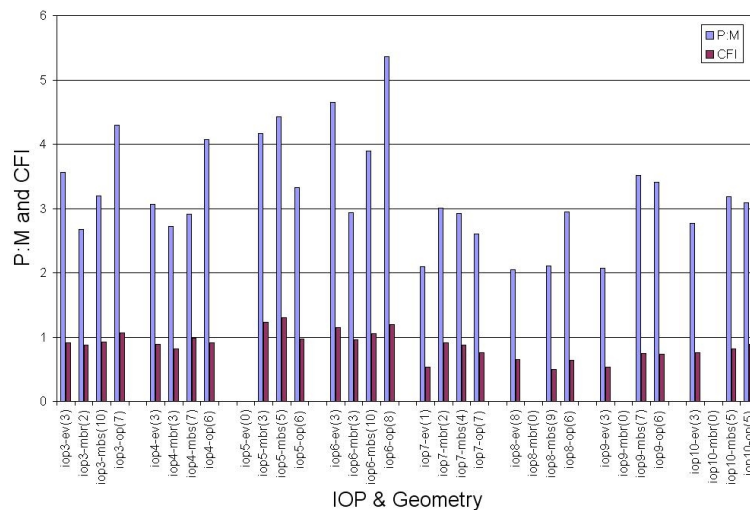


Figure 1. Peak to mean ratio (P:M) and concentration fluctuation intensity (CFI) plotted by edge vortex (ev), midblock roof (mbr), midblock street (mbs), and open (op) sampler locations.

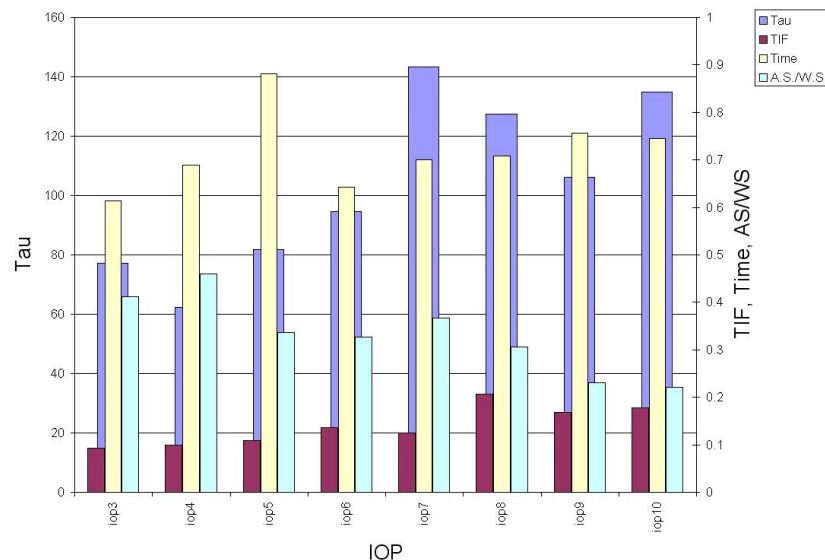


Figure 2. Exponential tracer decay time (Tau), fraction of the total integrated concentration (TIF), total time tracer was detected, and the plume arrival speed (Time), and plume arrival speed divided by the plume arrival time (AS/WS) plotted by IOP.

(AS/WS) by IOP. These graphs show (1) daytime periods are characterized by higher P:M and CFI than nighttime periods, (2) the decay of the tracer plume is slower during the night than day, and (3) the tracer plumes at night tend to arrive more slowly and depart more slowly than during the daytime relative to the ambient wind speed aloft. The implications of these observations and the physical causes underlying them are being worked out for inclusion in a journal article presently in development. (Dennis Finn, 208-526-0566)

### ***UrbaNet/Air Resources Lab***

A member of the FRD staff attended a meeting on urban test beds sponsored by the Office of the Federal Coordinator for Meteorology (OFCM) in Silver Spring. The main focus of the meeting was to develop a strategy for implementing the tests beds that has broad support both in the public and private sectors. The UrbaNet program received considerable attention, since it is already developing the meteorological infrastructure for urban test beds in several cities. Dr. Jerry Allwine also presented an overview of the Urban Dispersion Program, including some of the tracer work conducted by FRD, during the OFCM meeting. (Richard Eckman, 208-526-2740)

### ***ET Probe***

The ET probe has been included as part of a draft NOAA-NIST partnership on hazard resilient communities. The goal of the program is to carry out research and development that will reduce the vulnerability of U.S. communities to both natural and man-made hazards. One of the elements in the plan is to obtain high-quality observations of winds and turbulence in hurricanes and other high-wind events so that structures can be designed to better resist wind damage. The ET probe is clearly well suited for such applications. (Richard Eckman, 208-526-2740)

### ***Smart Balloon***

All six of the smart balloon transponders for the Texas Air Quality Study II (TexAQS II) in August have been constructed and tested in the lab. They are currently being tested with batteries and the internal antenna outside the lab facility. Communications are currently working well and final connections and leak testing of the fiberglass transponder housing is in progress. The battery packs and solar panels have not yet been built and these need to be prepared for each of the smart balloon payloads.

Because of problems with the NOAA P-3, which currently has a planned arrival date of August 25 or later, we have delayed our arrival to be ready for deployment on August 22, 2006. (Randy Johnson, 208-526-2129)

### ***Atmospheric Tracer Chemical Analysis Upgrade***

We leased two halogen specific detectors from OI Analytical for two months with the intent to test them with the gas chromatographs (GC) and as possible replacements for the continuous tracer analyzers. We have completed our testing of the detectors both on the GCs and as a continuous analyzer. We were able to analyze the tracers with both detectors. The XSD was

also very easy to set up as a continuous analyzer. Unfortunately, the concentrations that they were able to detect were not low enough to make them usable for our tracer studies (>10 ppmv). Both were interesting to work with and the technology they employ may be adaptable to our needs in the future. (Roger Carter, 208-526-2745, and Debbie Lacroix)

## **Cooperative Research with DOE NE-ID (Idaho National Laboratory)**

### ***Emergency Operations Center (EOC)***

An EOC requalification drill was conducted on 13 June. The drill scenario centered on a tornado that damaged some buildings at the Reactor Technologies Complex. The NOAA team provided meteorological support and operated and interpreted the FRD transport and dispersion model. (Jason Rich, 208-526-9513, Randy Johnson, and Dennis Finn)

A Quarterly Assessment drill was held at the new alternate INL Emergency Operations Center on 29 June. A tour of the new facility was conducted. Afterwards, participants discussed issues regarding possible EOC activations including wildfire potential and other events at site facilities. Participants also had a tabletop discussion on a scenario involving a tornado at the Reactor Technologies Complex. (Neil Hukari, 208-526-0503)

### ***INL Climatology***

A draft of the Climatology of the Idaho National Laboratory 3<sup>rd</sup> Edition was completed during June and submitted for internal FRD review. A formal draft of the new edition is expected to be ready for full ARL review in August. (Jason Rich, 208-526-9513)

### ***Mesoscale Forecast Modeling***

The new Dell Linux workstation for testing of the Weather Research and Forecasting (WRF) mesoscale model was delivered to FRD in June. So far, all the work has focused on getting the system configured and enhanced for protection against internet security threats. The workstation has two dual-core Intel processors, so on some system utilities the computer appears to have four processors total. Initially, WRF will likely be configured similar to the existing MM5 forecast system at FRD. (Richard Eckman, 208-526-2740)

Currently, the MM5 forecast output is being posted to the FRD web pages through a Network File System (NFS) connection. To enhance network security, FRD is looking at replacing the NFS connection with a more secure configuration based on the OpenSSH utilities. All communication between the computers would then be encrypted and require public-key authentication. This change would also allow one of FRD's legacy computers to be deactivated, since it is currently used only for running the NFS server. (Richard Eckman, 208-526-2740, and Brad Reese)

### ***Transport and Dispersion Modeling/Annual INL Dose Assessment***

In early June FRD completed the annual INL dispersion estimates for calendar year 2005. These estimates are obtained by running a version of the MDIFF puff model over an entire year using archived data from the NOAA INL Mesonet. The runs are repeated for eight of the facilities within INL. Overall, the annual dispersion patterns for 2005 are qualitatively similar to those from past years. The dispersion estimates will be included in the 2005 INL Site Environmental Report. (Richard Eckman, 208-526-2740)

NOAA staff participated in the June meeting of the INL Monitoring and Surveillance Committee. This meeting included a presentation by the U.S. Geological Survey on estimated peak water flows for the Big Lost River. The planned renovations at the Lost River Rest Stop were also brought up at the meeting. These renovations will require the existing Mesonet tower and nearby public display to be moved. (Richard Eckman, 208-526-2740)

### **Other Activities**

#### ***Papers***

Warner, T., P. Benda, S. Swerdlin, J. Knievel, E. Argenta, B. Aronian, B. Balsley, J. Bowers, R. Carter, P. A. Clark, K. L. Clawson, J. Copeland, A. Crook, R. Frehlich, M. L. Jensen, Y. Liu, S. Mayor, Y. Meillier, B. Morley, R. Sharman, S. Spuler, D. Storwold, J. Sun, J. Weil, M. Xu, A. Yates, Y. Zhang, 2006: The Pentagon Shield Field Program: Toward critical Infrastructure Protection. *Bull. Am. Met. Soc.*, Submitted and returned for minor revision.

#### ***Travel***

Rick Eckman, 14-16 June, Silver Spring, MD, to attend a planning meeting on joint urban test beds at the Office of the Federal Coordinator for Meteorology (OFCM).

#### ***Training***

Debbie Lacroix, 5-9 June, Chicago, Illinois, to attend Gas Chromatography: Fundamentals, Troubleshooting & Method Development training, sponsored by Axion.

#### ***Personnel***

Blair R. Carter entered on duty on June 5, 2006 as a Physical Science Technician (intermittent temporary appointment not to exceed one-year) under the Student Temporary Employment Program (STEP). He is assisting FRD engineers and physical scientists on various projects. Blair returns to the University of Idaho this fall as a senior majoring in Applied Mathematics, and he plans to graduate in May 2007 with a B.S. degree.